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CORRELATION AND PATH ANALYSIS IN OKRA (*Abelmoschus esculentus* (L.) MOENCH)

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ABSTRACT

The present investigations were conducted on 30 genotypes of okra. Fruit yield have positive and significant correlation with number of branches per plant, number of nodes per plant, fruit length and number of fruits per plant. Path analysis revealed the positive and direct effect of height of first fruiting node, number of branches per plant, number of first fruiting node, fruit length, length of internodes, number of fruits per plant and fruit width on fruit yield per plant. Indirect contribution of length of internodes, number of first fruiting node, plant height and fruit length were positive. It was suggested that the number of branches per plant, number of nodes per plant, fruit length and number of fruits per plant can be considered as suitable selection index which would effectively improve fruit yield in okra.

Key words : *Okra, Correlation coefficient analysis, path analysis.*

Okra (*Abelmoschus esculentus* (L.) Moench) is one of the most important fruit vegetable. It is grown in various region of India and covers practically all ecological zones. Its production and productivity is very low in comparison to other countries due to poor cultural practices & lack of improved varieties. Since yield is a quantitative character, it is highly influenced by environment. Selection of the lines based on only yield may not be effective. Therefore, knowledge about the nature and magnitude of association of yield with various component characters is of paramount importance to bring improvement in the desired direction. Keeping this in the view, the present investigation in okra was undertaken to find the associations among different pairs of characters and to know the direct and indirect effects of various component characters on yield which could be useful in providing information about the characters for exercising effective selection for higher yield.

MATERIALS AND METHODS

The present investigations were conducted at Crop Research Farm, Post Graduate College Ghazipur, (U.P.) during summer season of 2008 and 2009. The experimental material consisting of thirty genotypes of okra. The experiment was laid out in a randomized block design with three replications. Each genotype was grown in 4 row of 3 meters length plot in each replication. Row to row and plant to plant spacing was kept 60 cm and 45 cm respectively. All the recommended cultural practices and plant protection measures were followed. The observations were recorded on ten randomly selected plant. Data were recorded for eleven characters viz. days to 50% flowering, plant height (cm.), number of branches/plant, number of nodes/plant, number of first fruiting node, height of first fruiting node(cm), length of internodes (cm.), fruit length (cm.), fruit width (cm.), number of fruits/plant and fruit yield/plant(g). The genotypic and phenotypic correlation coefficients were calculated from three replications value of each genotypes by (1). Path coefficient analysis was also done as per the method suggested by (2).

RESULTS AND DISCUSSION

Genotypic and Phenotypic correlations among different pairs of characters are given in Table-1. In general the estimates of genotypic correlation coefficients were higher than the estimates of phenotypic correlation coefficients. This indicates that environment also play a role in determining the relative contributions of different characters revealing thereby the prominence of additive and additive x additive gene action (3).

Fruit yield per plant showed positive and significant correlation with number of branches per plant, number of nodes per plant, fruit length and

Table 1: Phenotypic and genotypic correlation coefficients among different quantitative traits in okra.

Character		Plant height (cm)	No. of branches/plant	No. of nodes/ plant	No.of first fruiting node	Height of first fruiting node(cm)	Length of internodes (cm)	Fruit length (cm)	Fruit width (cm)	Number of fruits/ plant	Fruit yield /plant (g)
Days to 50% flowering	P	-0.262*	0.535**	0.212*	0.603**	0.283**	-0.194	0.281**	0.396**	-0.292**	-0.087
	G	-0. 288**	0. 651**	0.352**	0.712**	0.332**	-0.229*	0.362**	0.480**	-0.338**	-0.060
Plant height(cm)	P	-	-0.261*	0.372**	0.075	0.492**	0.903**	-0.001	- 0.355**	0.447**	0.120
	G	-	-0.361**	0. 399**	0.061	0.526**	0.920**	-0.004	-0.394**	0.500**	0.094
Number of branches/plant	P		-	0.384**	0.493**	-0.026	-0.317**	0.115	0.564**	-0.030	0.285**
	G		-	0.373**	0.548**	-0.083	-0.389**	0.135	0.681**	- 0.181	0.265*
Number of nodes/ plant	P			-	0.598**	0.280**	0.152	0.151	-0.004	0.616**	0.537**
	G			-	0.616**	0.240*	0.174	0.192	0.010	0.603**	0.599**
Number of first fruiting node	P				-	0.602**	0.095	0.453**	0.143	-0.187	0.112
	G				-	0.590**	0.097	0.558**	0.173	-0.270**	0.198
Height of first fruiting node	P					-	0.603**	0.358**	-0.163	-0.170	-0.136
	G					-	0.641**	0.401**	-0.173	-0.283**	-0.147
Length of internodes	P						-	0.073	-0.349**	0.163	-0.095
	G						-	0.086	-0.375**	0.180	-0.121
Fruit length	P							-	0.027	-0.208*	0.276**
	G							-	0.000	-0.314**	0.288**
Fruit width	P								-	-0.158	0.092
	G								-	-0.212*	0.078
Number of fruits/plant	P									-	0.560**
	G									-	0.452**

*, ** Significant at 5% and 1% levels, respectively.

number of fruits per plant. Positive and significant correlation between fruit yield and the number of branches per plant, number of nodes per plant was reported by (4). Therefore, it is suggested that since yield is a complex character, one should aim to improving characters positively with yield rather that directly attempting to improve it.

Days to 50% flowering showed positive and significant correlation with number of branches per plant, number of nodes per plant, number of first fruiting node, height of first fruiting node and fruit width. Similarly the plant height have positive and significant correlation with number of nodes per plant, height of first fruiting nodes and length of internodes. On the other hand number of nodes per plant have positive and significant correlation with height of first fruiting node, length of internodes. The number of first fruiting node showed positive and significant correlation with height of first fruiting node and fruit length. Similar result have been reported by (4).

Negative and significant correlation were also observed between number of fruits per plant and days to 50% flowering, number of first fruiting nodes and fruit

Table 2: Direct and indirect effects among different quantitative traits towards fruit yield in okra.

Character	Days to 50% flowering	Plant Height (cm)	Number of branches/plant	Number of nodes/plant	No. of first fruiting node	Height of first fruiting node (cm)	Length of internodes (cm)	Fruit Length (cm)	Fruit width (cm)	Number of fruits/plant	Correlation with fruit yield/plant
Days to 50% flowering	**-0.837**	0.308	0.379	-0.160	0.390	0.207	-0.054	0.182	0.046	-0.521	-0.087
Plant height (cm)	0.241	**-1.070**	-0.210	-0.181	0.033	0.329	0.219	-0.002	-0.038	0.772	0.120
Number of branches/plant	-0.545	0.386	**0.582**	-0.169	0.300	-0.051	-0.093	0.067	0.065	-0.279	0.285**
Number of nodes/plant	-0.294	-0.426	0.217	**-0.455**	0.338	0.150	0.041	0.096	0.000	0.931	0.537**
Number of first fruiting node	-0.596	-0.065	0.319	-0.281	**0.548**	0.369	0.023	0.280	0.016	0.417	-0.112
Height of first fruiting node (cm)	-0.277	-0.563	-0.048	-0.109	0.323	**0.625**	0.153	0.201	-0.016	-0.436	-0.136
Length of internodes (cm)	0.192	-0.984	0.226	-0.079	0.053	0.401	**0.239**	0.043	-0.036	-0.277	-0.095
Fruit length (cm)	-0.303	0.004	0.078	-0.087	0.306	0.250	0.020	**0.503**	-0.000	-0.484	0.276**
Fruit width (cm)	-0.401	0.421	0.396	-0.004	0.095	-0.108	-0.089	-0.000	**0.096**	-0.336	0.092
Number of fruits/plant	0.282	-0.535	-0.105	-0.275	-0.148	-0.176	0.042	-0.157	-0.020	**1.544**	0.560**

*Significant at 5% and 1% level of significance.

length; fruit width with plant height and length of internodes; length of internodes with number of branches per plant; number of branches per plant with plant height; plant height with days to 50% flowering.

In view of the fact that correlation coefficient do not take into account extremely complex inter-relationship between various characters, path analysis was applied to partition the correlation coefficient into direct and indirect effects. The result of the path analysis (Table-2) revealed that highest and positive direct effect on the fruit yield exhibited by height of first fruiting node followed by number of branches per plant, number of first fruiting node, fruit length of inter node, number of fruit per plant and fruit width. These characters have positive and significant correlation with fruit yield. Therefore, selection should be practiced for these characters in order the improve yield. Similar result have been reported by (4).

The height of first fruiting node have high positive and indirect effect on fruit yield per plant via length of internodes followed by number of first fruiting node, plant height, fruit length, days to 50% flowering and number of nodes per plant. The results of the present investigations as discussed here have conclusively indicated that due to emphasis should be given to character viz number of branches per plant, number of nodes per plant, fruit length and number of fruits per plant for improving the yield potential of okra.

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